



Drought Update Monterey County

Salinas Valley Groundwater Basin

**Peter Kwiek, P.G. Hydrologist
Howard Franklin, P.G. Senior Hydrologist**



Overview

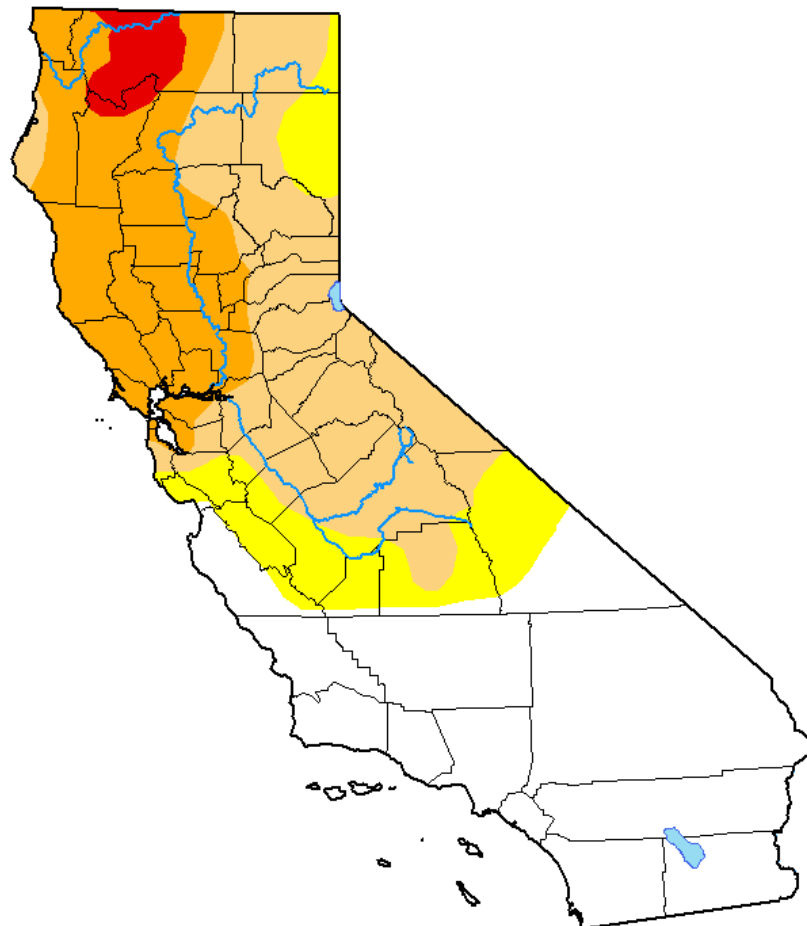
- 1. Monterey County is experiencing extreme drought conditions**
- 2. The 2021 fire season has already had greater than normal activity**
- 3. Reservoir operations continue**
- 4. Groundwater Impacts are delayed**
- 5. Monterey County Water Recycling Projects continue to provide water with anticipated limitations**



Summer 2020 Drought Monitor



June 16, 2020



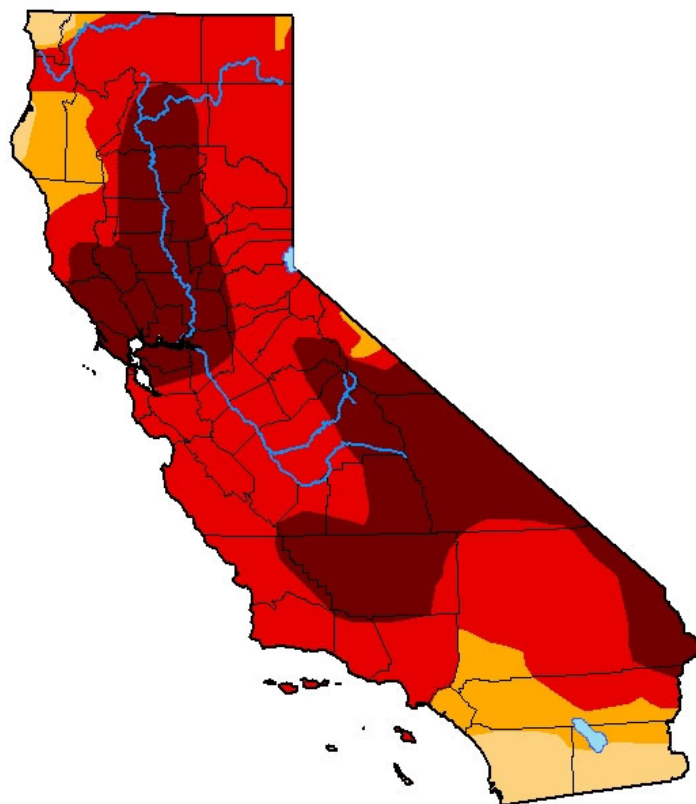


Current Conditions



U.S. Drought Monitor California

June 22, 2021
(Released Thursday, Jun. 24, 2021)
Valid 8 a.m. EDT



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <http://droughtmonitor.unl.edu/About.aspx>

Author:

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National Drought Mitigation Center

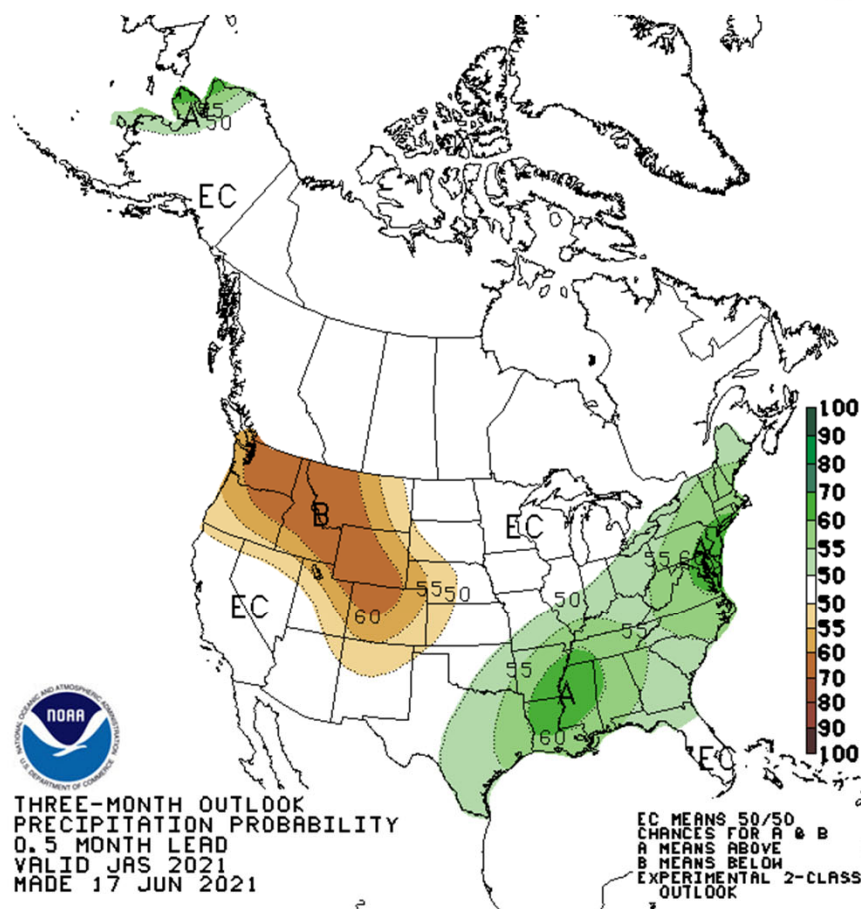
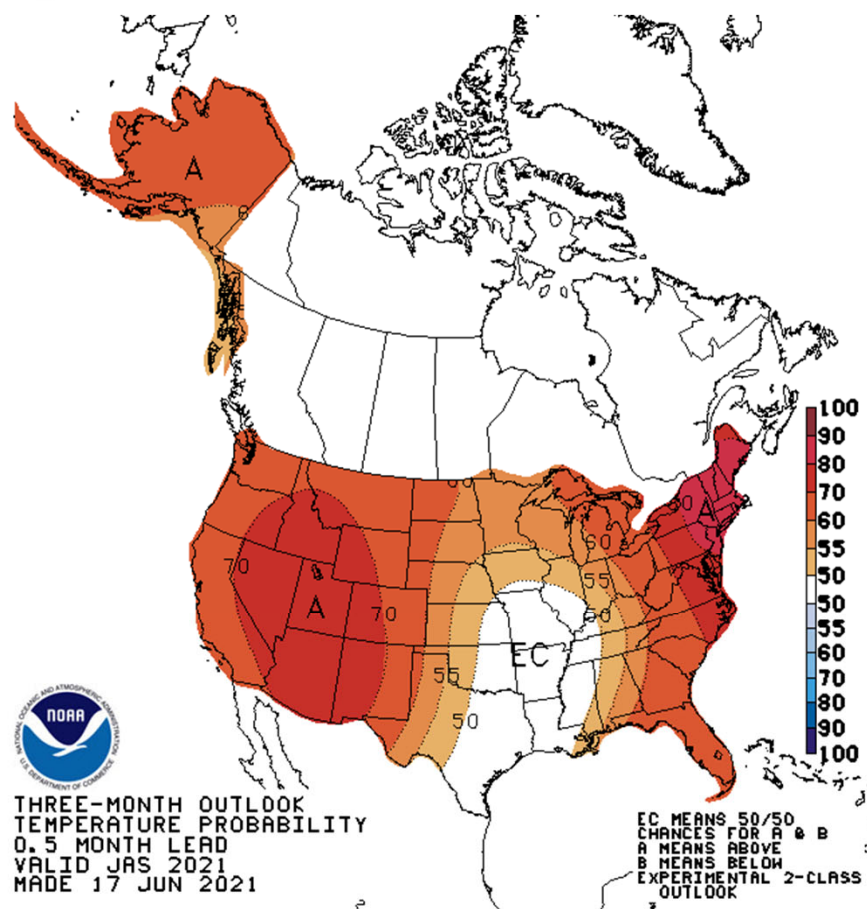


droughtmonitor.unl.edu



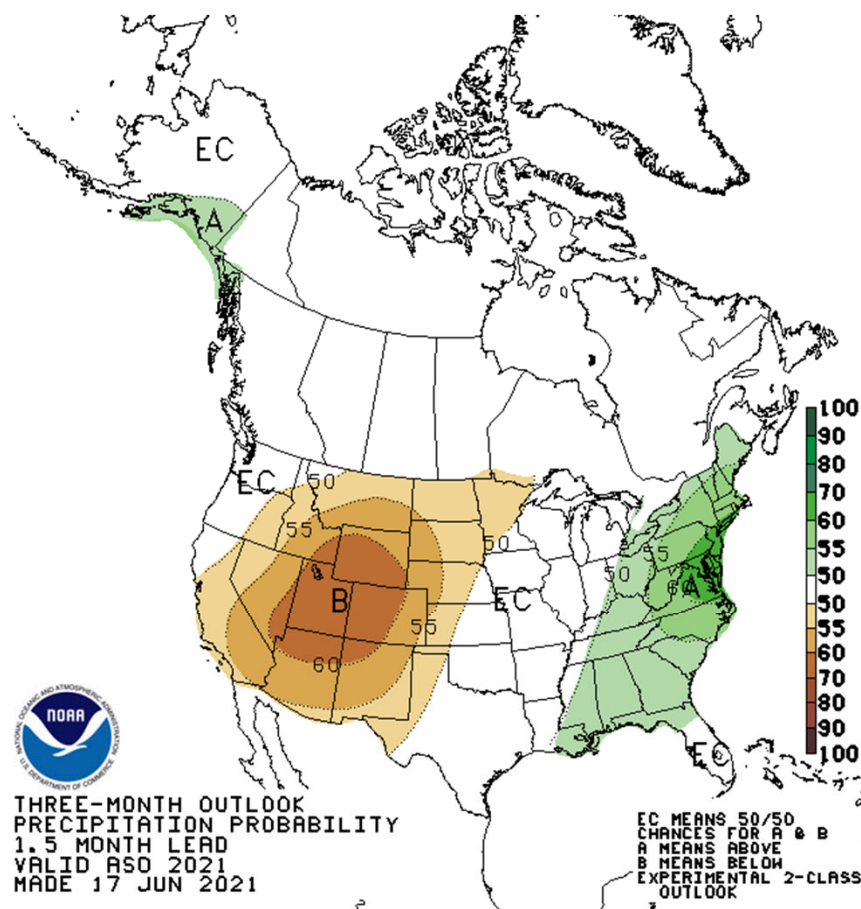
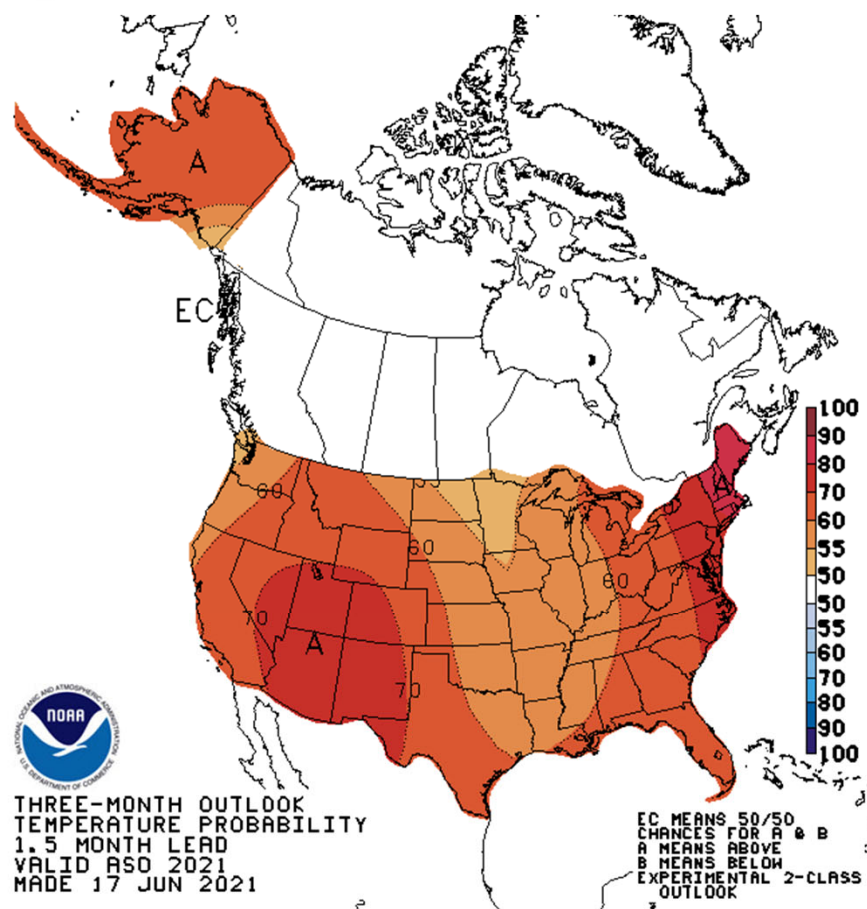


Fire Season Outlook



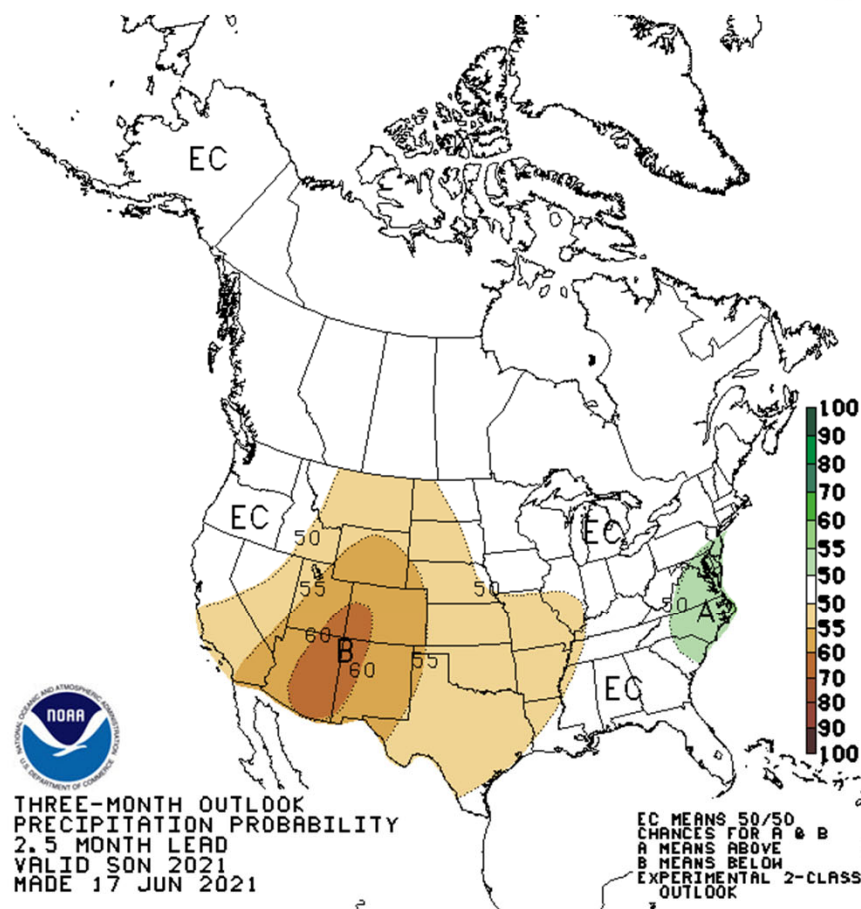
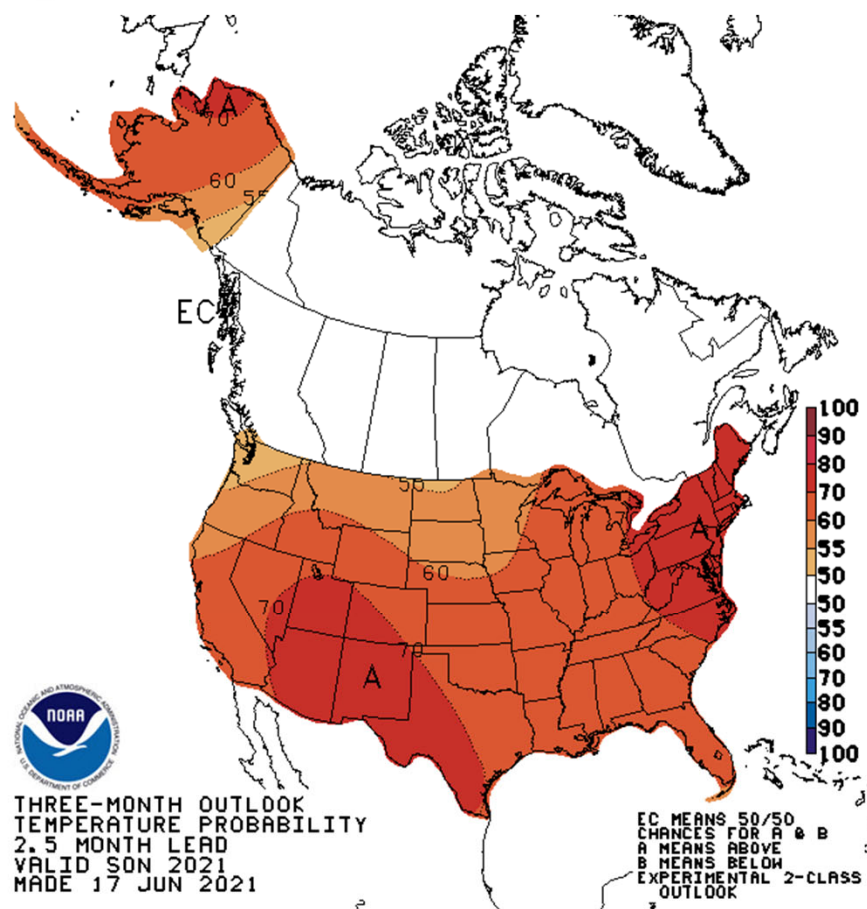


Fire Season Outlook



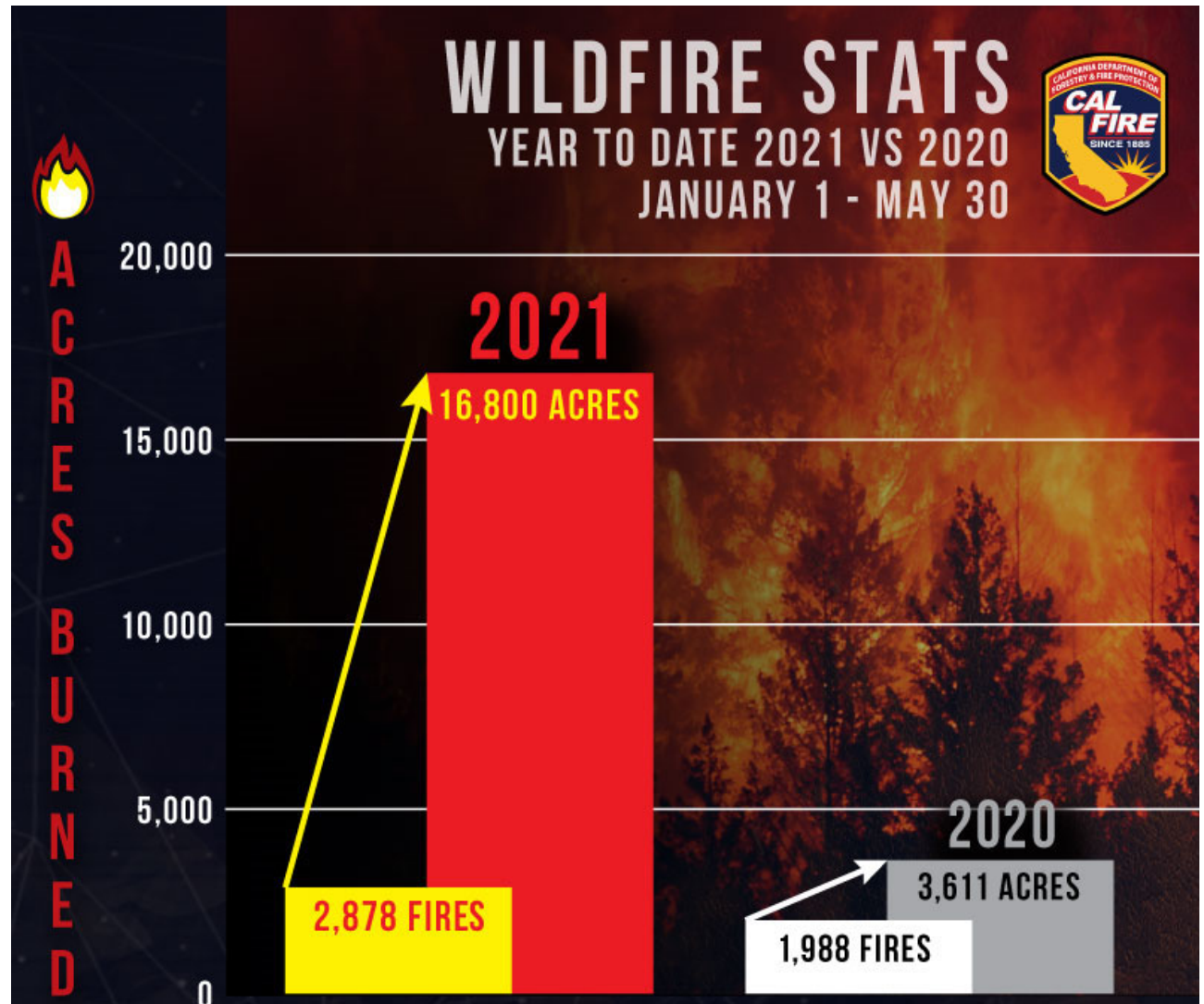


Fire Season Outlook





2021 Fire Season





Reservoir Operations

**Peter Kwiek, P.G.
Hydrologist
Water Resources Agency**



Take Home

- 1. Drought conditions do not have an immediate impact on operations.**
- 2. Without significant inflows in 2022, there will be little if any water for operations next spring and summer.**
- 3. Extended drought conditions impact our operations well beyond the period of drought.**



Take Home

- 1. Drought conditions do not have an immediate impact on operations.**
- 2. Without significant inflows in 2022, there will be little if any water for operations next spring and summer.**
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Reservoir Operations



Nacimiento Reservoir
Completed in 1957
Lake Capacity 377,900 AF

San Antonio Reservoir
Completed in 1967
Lake Capacity 335,000 AF



Reservoir Operations

(Conservation Season)

➤ Recharge Groundwater Basin



Reservoir Operations

(Conservation Season)

- Recharge Groundwater Basin
- Salinas River Diversion Facility (SRDF)
- Downstream environmental flow Requirements

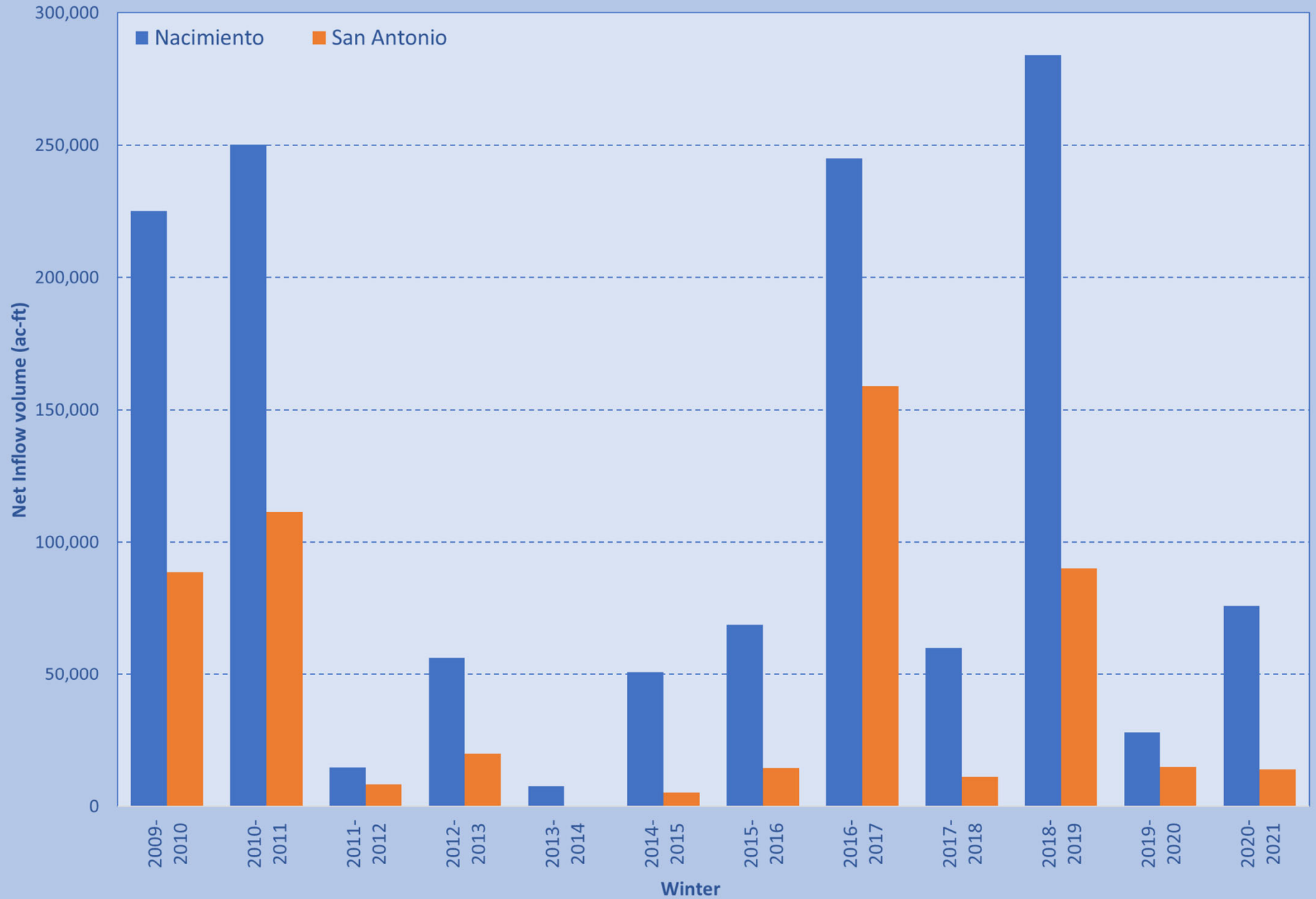


Reservoir Operations

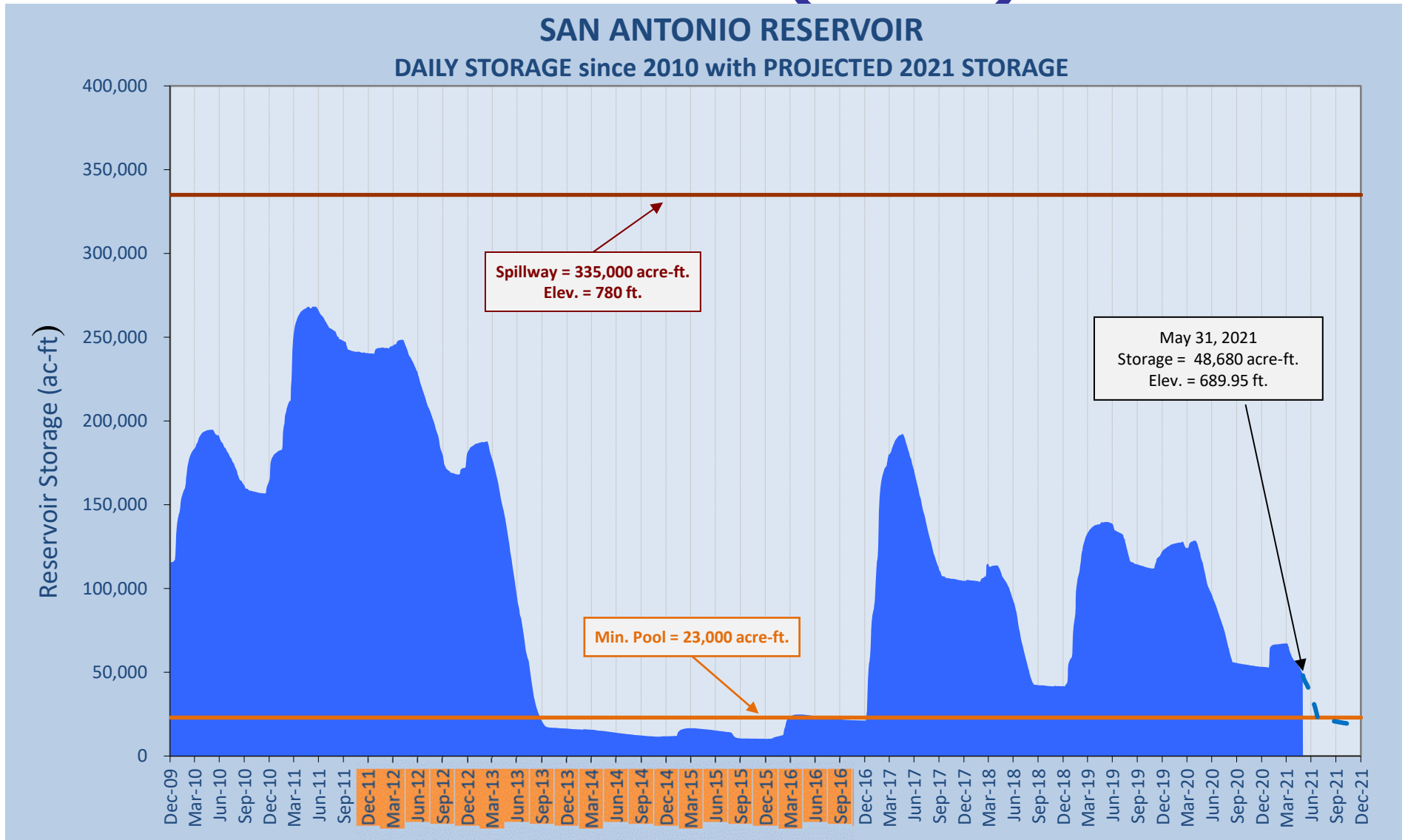
Current Reservoir Conditions (6/25/21)

	Nacimiento	San Antonio
Percentage of Capacity	23%	12%
Elevation (ft.)	727.4	681.95
Storage (ac-ft)	85,780	38,593
Releases (cfs)	425	215

Net Reservoir Inflow Totals Since 2010

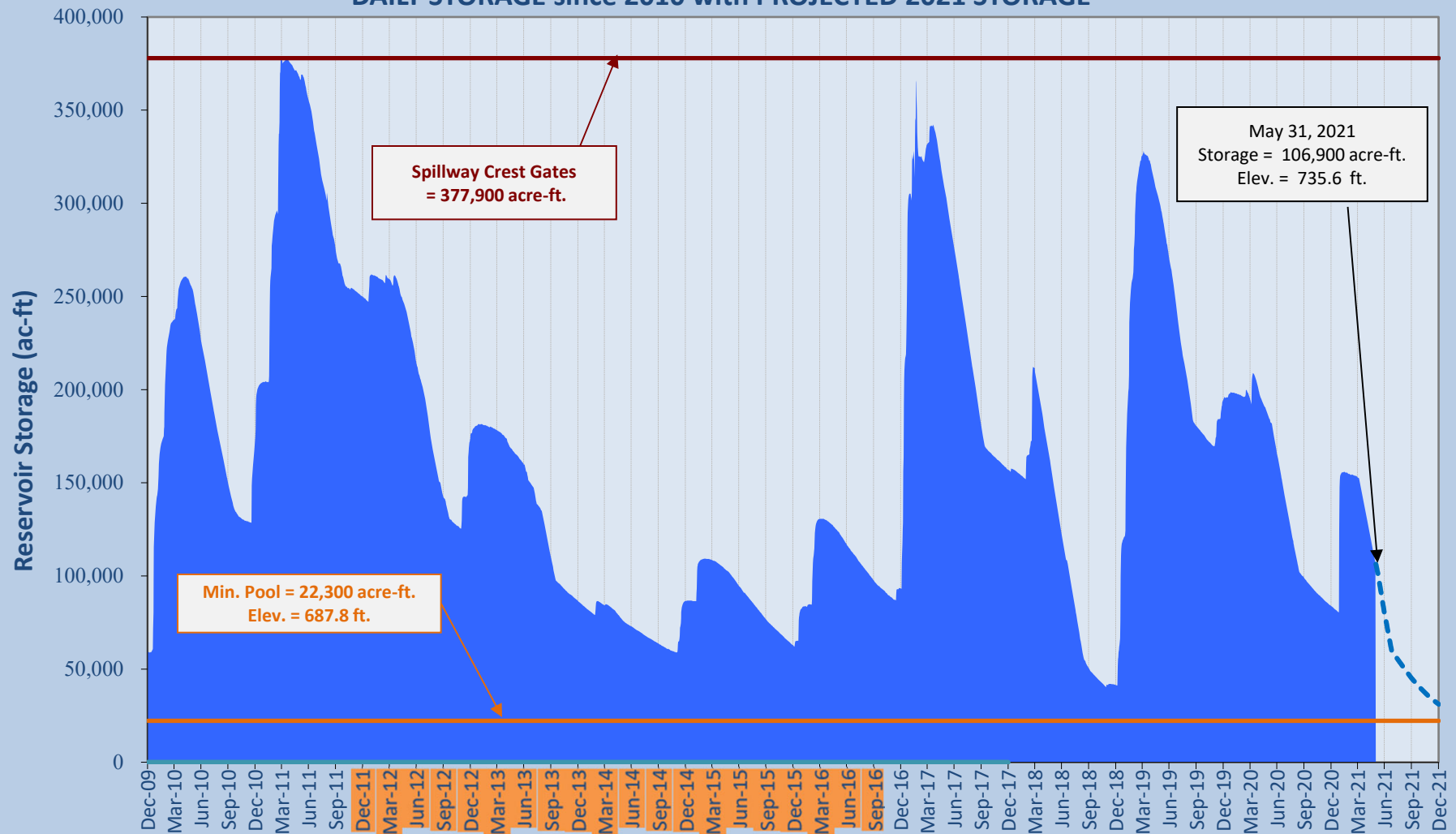


Discussion (cont.)



Discussion (cont.)

NACIMIENTO RESERVOIR
DAILY STORAGE since 2010 with PROJECTED 2021 STORAGE



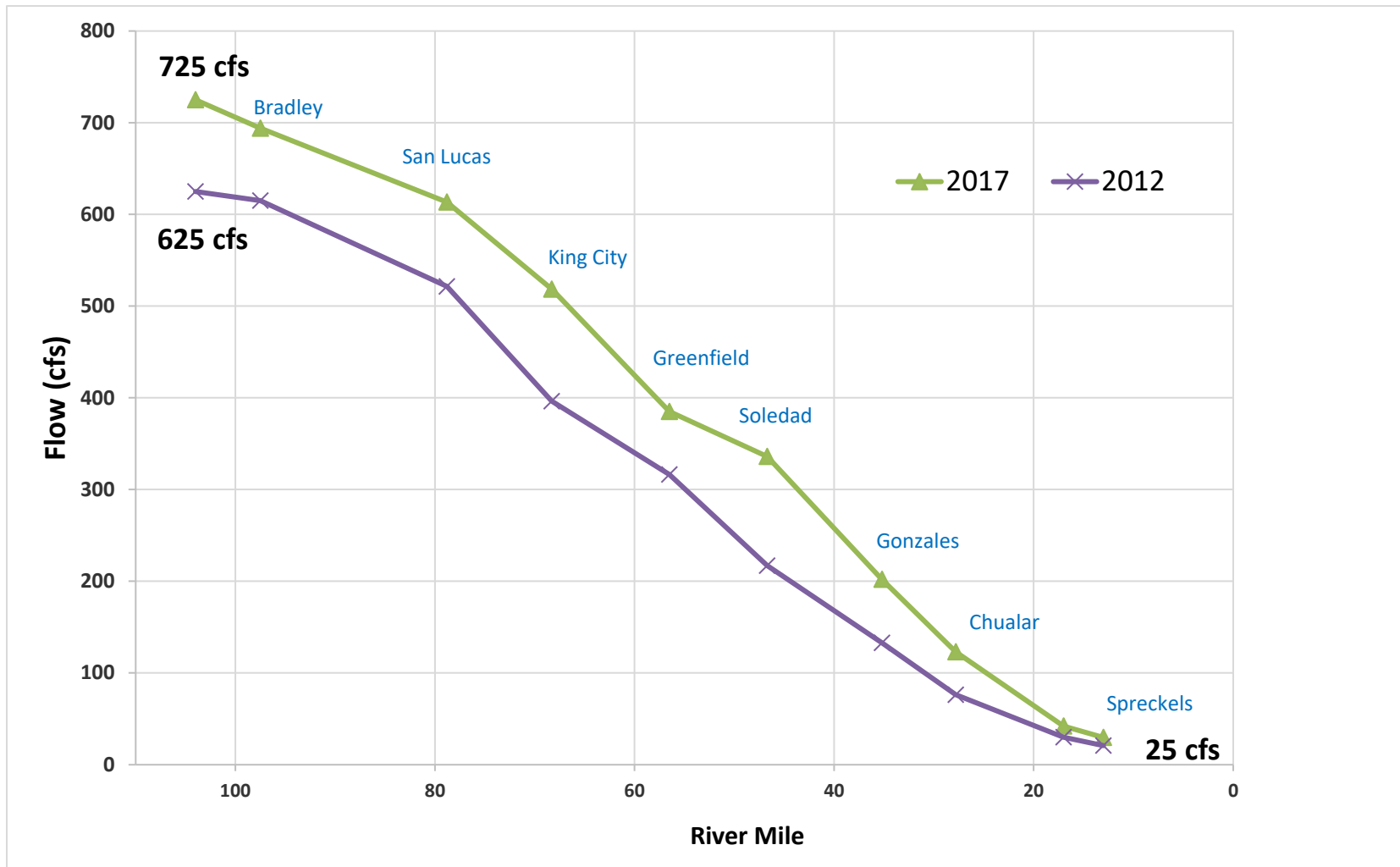


How Much Water is Needed to Operate?

Depends on Many factors

- Weather
- Groundwater Extractions
- Surface Water Diversions
- Agricultural Return Flow
- Riparian Evapotranspiration
- Cumulative effects of extended weather conditions (droughts, wet periods)

Releases & Streamflow





Summary

- Because of our reservoirs, drought conditions do not have an immediate impact on operations, and in some cases they can get us through dry periods.
- Without significant inflows in 2022, there will be little if any water in storage for groundwater recharge or SRDF operations next spring and summer.
- Extended drought conditions impact our operations well beyond the period of drought.



Groundwater

**Howard Franklin, P.G.
Senior Hydrologist
Water Resources Agency**



Discussion

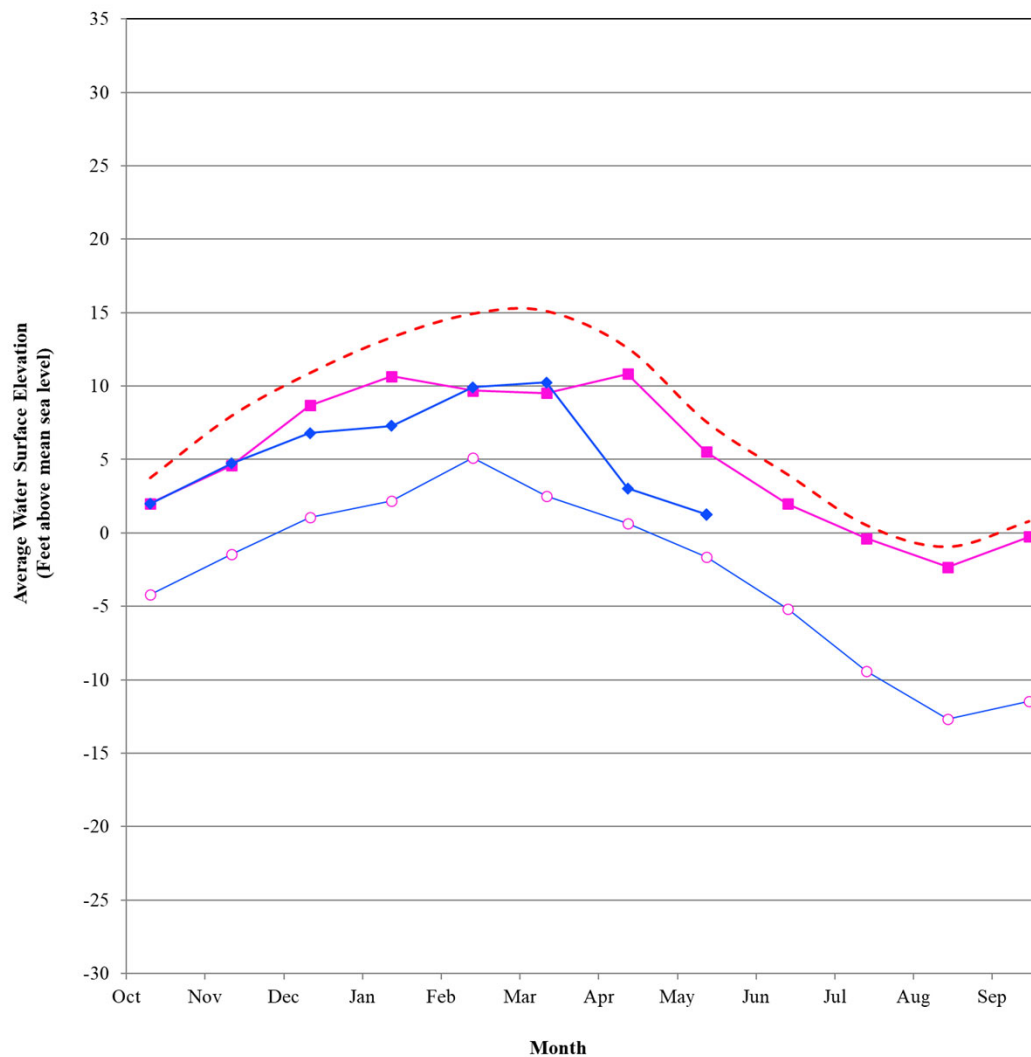
- Monterey County relies on Groundwater, and the Agency utilizes the reservoirs to help manage those supplies
- Of the last 10 years...
 - 8 of the last 10 years have been dry or drought conditions
 - 5 consecutive drought years from 2012-2016
 - 3 of the last 4 years have been dry or drought conditions
 - The last two consecutive years have been dry or drought conditions



180-Ft Aquifer

Average Groundwater Elevations
N=8 wells

- ◆— 2021 WY
- 2020 WY
- 2015 WY (Dry)
- - - 30 Year Average (1990 - 2020)

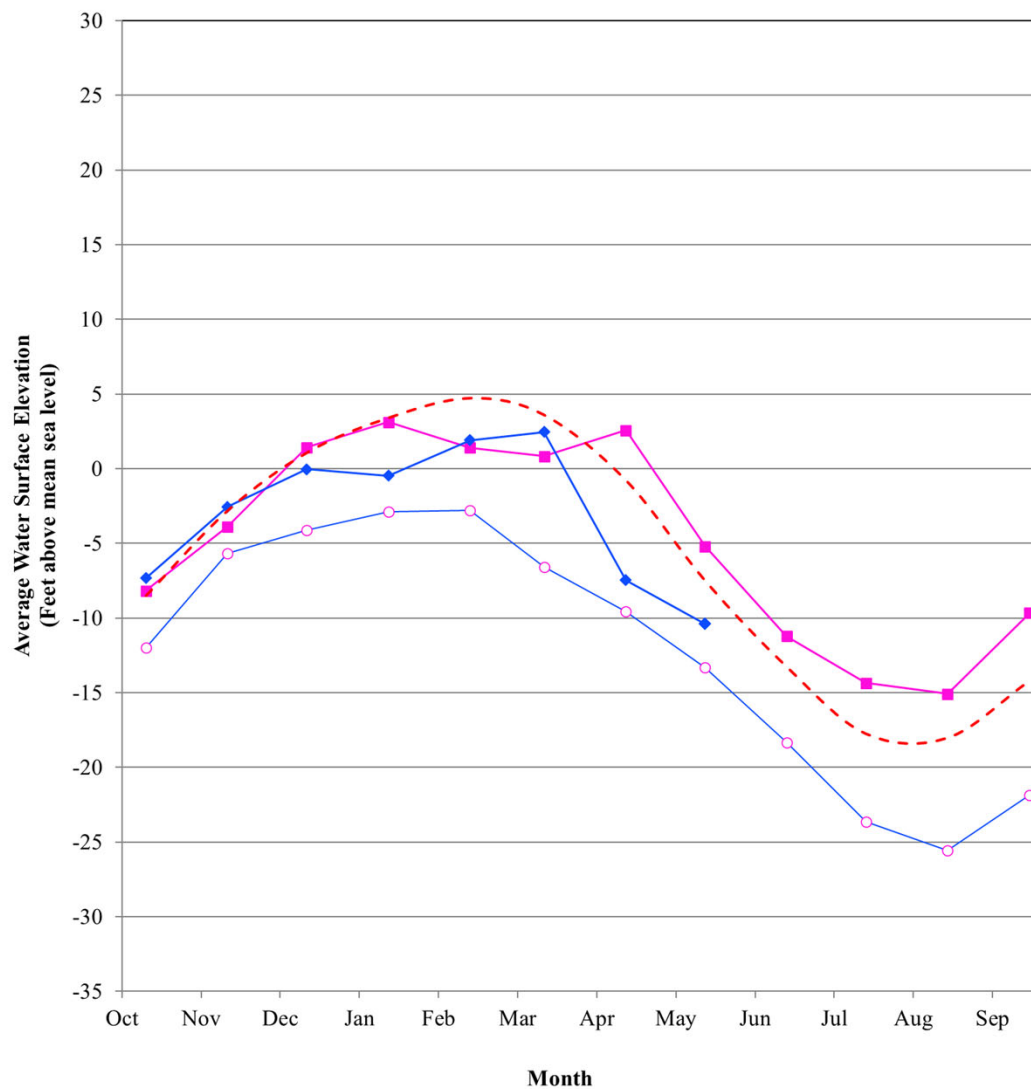




400-Ft Aquifer

Average Groundwater Elevations
N=12 wells

- ◆— 2021 WY
- 2020 WY
- 2015 WY (Dry)
- - - 30 Year Average (1990 - 2020)

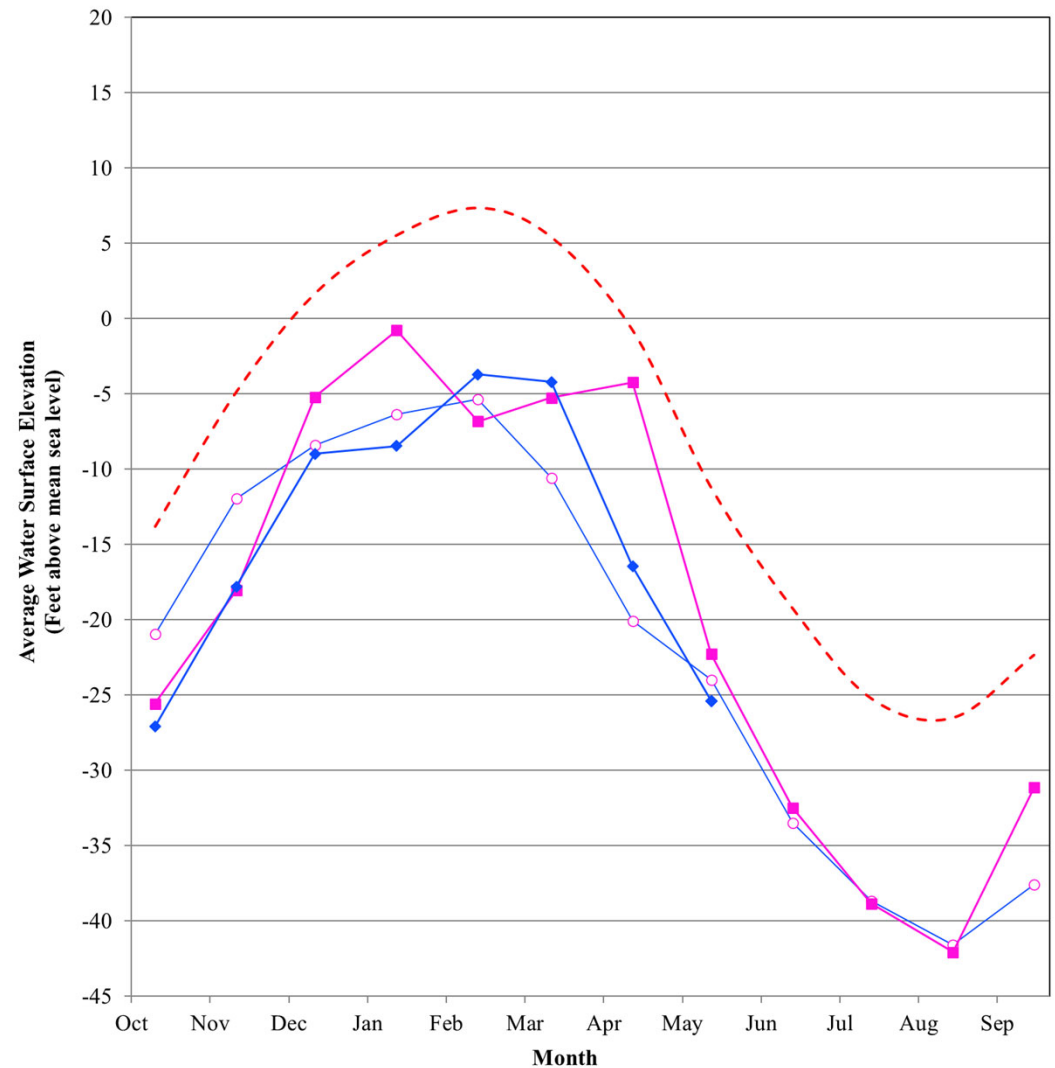




East Side Subarea

Average Groundwater Elevations
N=12 wells

- ◆— 2021 WY
- 2020 WY
- 2015 WY (Dry)
- - - 30 Year Average (1990 - 2020)

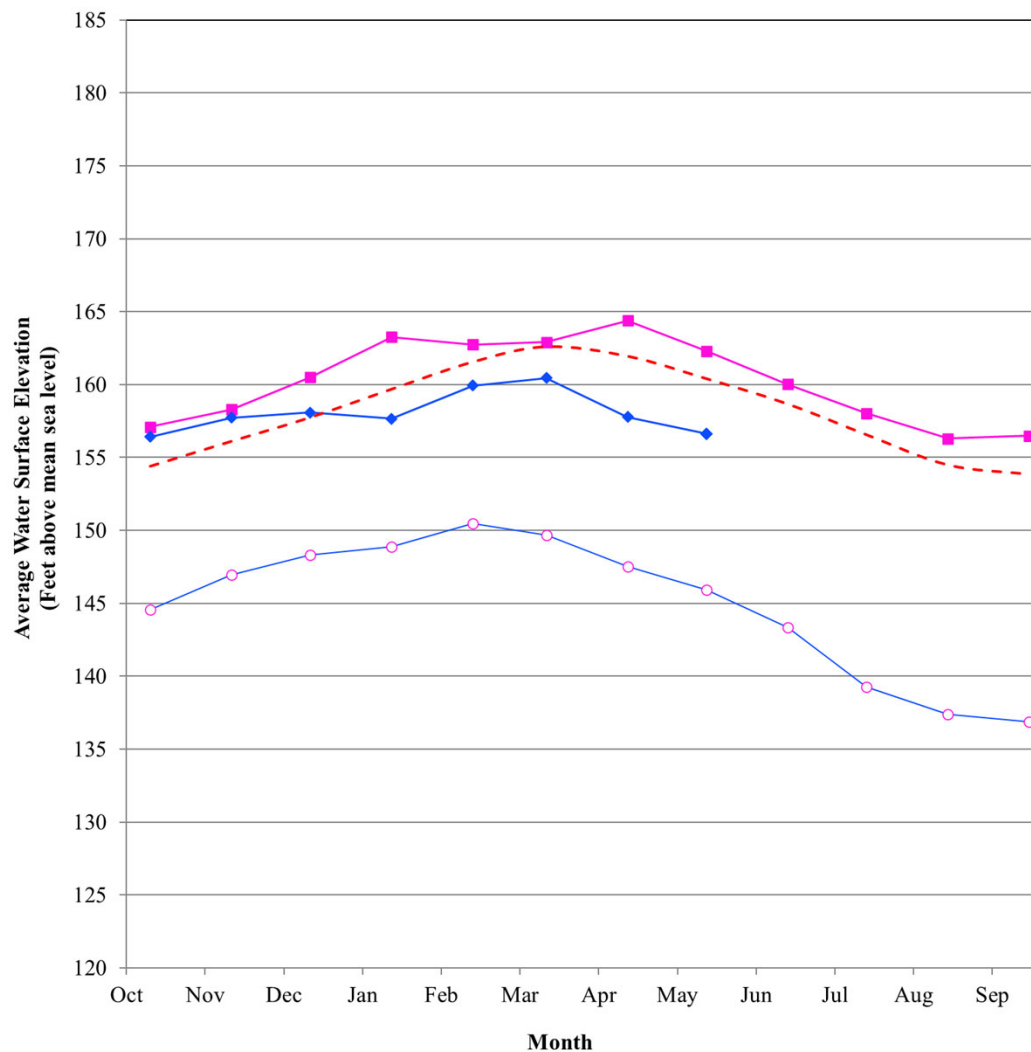




Forebay Subarea

Average Groundwater Elevations
N=13 wells

- ◆— 2021 WY
- 2020 WY
- 2015 WY (Dry)
- - - 30 Year Average (1990 - 2020)

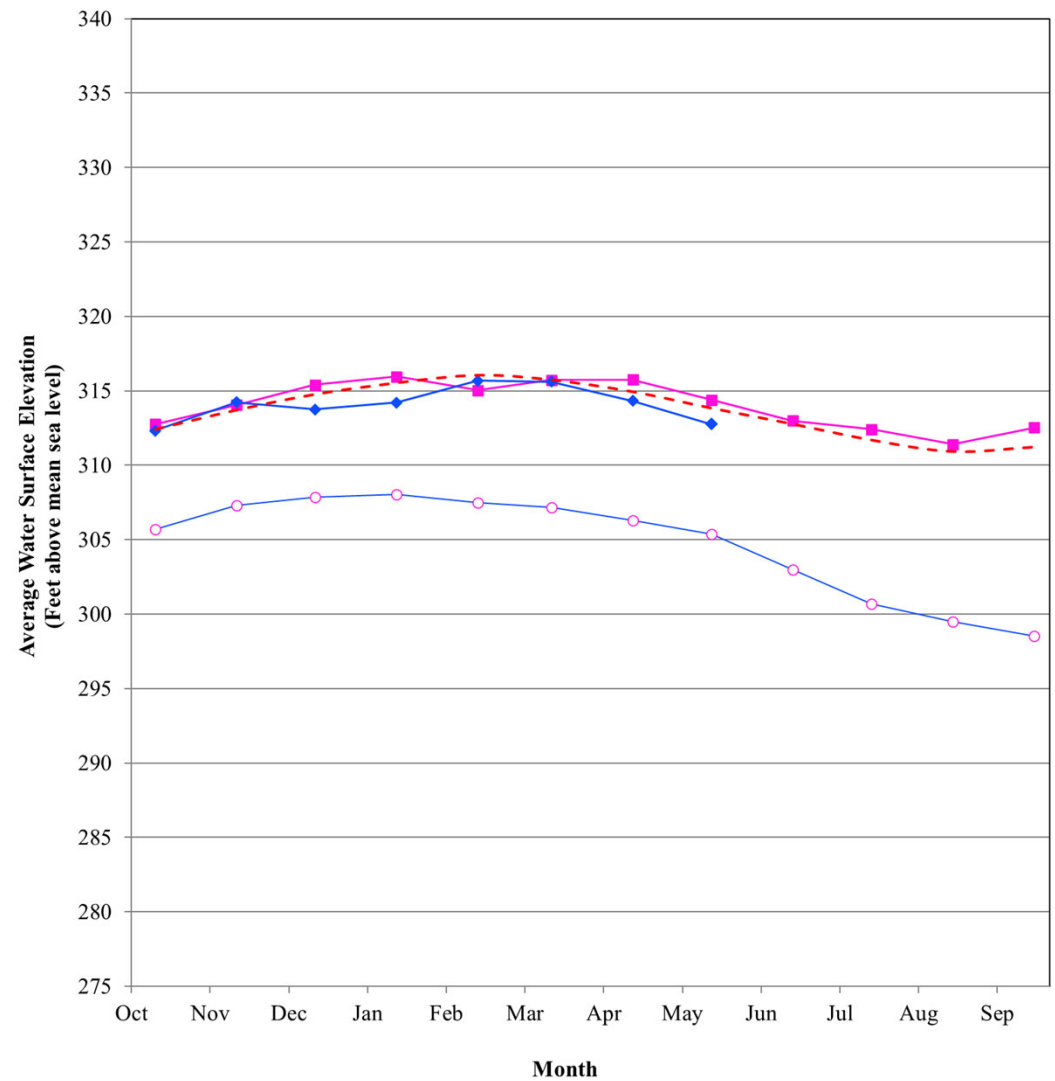




Upper Valley Subarea

Average Groundwater Elevations
N=9 wells

- ◆— 2021 WY
- 2020 WY
- 2015 WY (Dry)
- - - 30 Year Average (1990 - 2020)





Discussion

- If we see a third consecutive dry winter this season (2021 – 2022) then next year:
 - Limited surface water available from the reservoirs for groundwater recharge and diversions
 - Localized impact to groundwater supplies
 - Groundwater levels and water quality will continue to decline
 - Expansion of SWI in the coastal aquifers



Discussion

- If we see a fourth consecutive dry winter in 2022 – 2023:
 - Extreme limits to surface water availability from the reservoirs
 - Significant impacts to groundwater supplies throughout the Basin
 - Groundwater levels and water quality will decline, approaching historic lows in all aquifers



Discussion (cont.)

- Forebay and Upper Valley Subareas
 - » Municipal water supplies in some areas will become threatened
 - » Agricultural practices will be impacted
- In Coastal Areas
 - » SWI in the coastal aquifers will continue to expand
 - » Deep Aquifers will be further stressed



Monterey County Water Recycling Projects

**Peter Kwiek, P.G.
Hydrologist
Water Resources Agency**

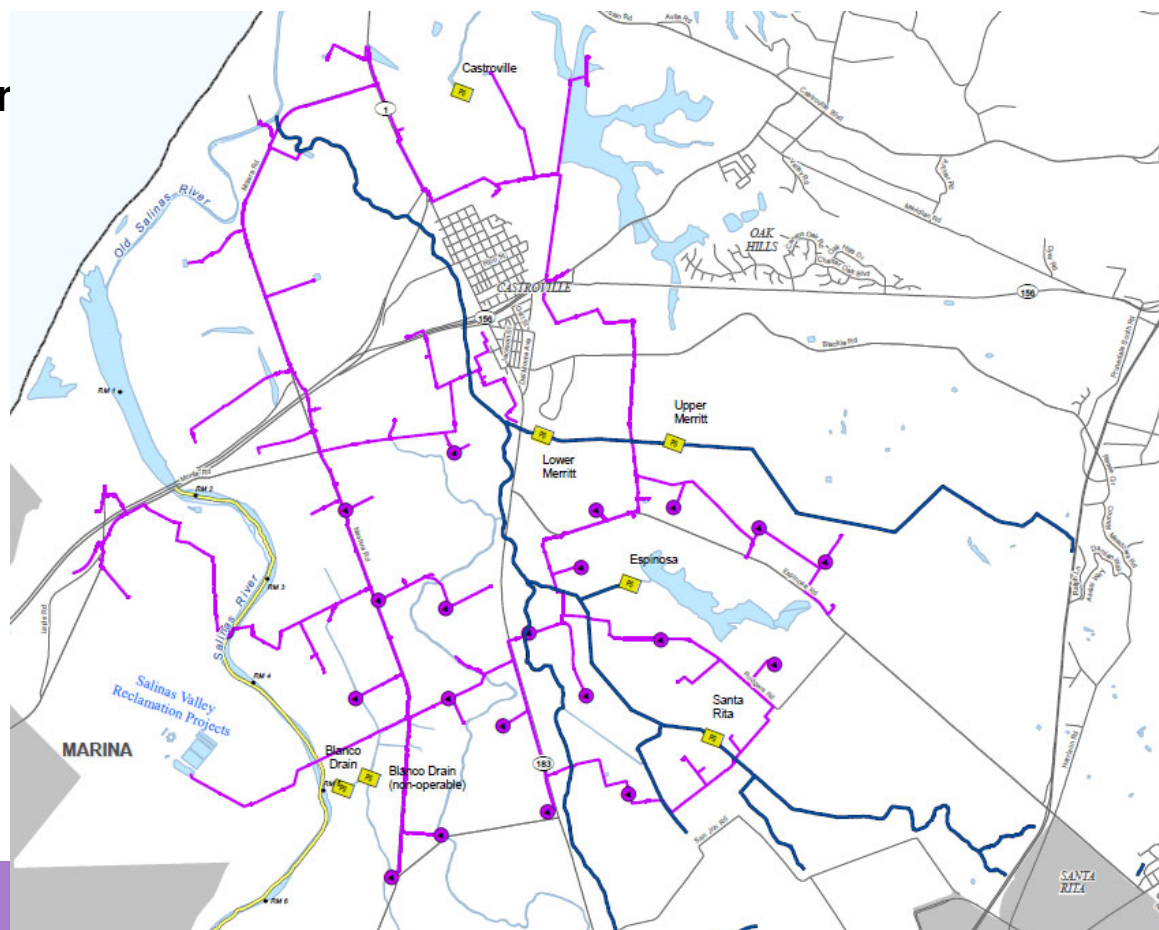
Monterey County Water Recycling Projects became operational in 1998 to slow the rate of seawater intrusion in the Pressure 400 Aquifer

DISTRIBUTION SYSTEM

Castroville Seawater Intrusion Project (CSIP)

- 48 miles of pipeline
- 21 supplemental wells
- 222 parcels
- 112 turnouts
- 9 monitoring stations
- 3 booster pumps stations
- \$37M Capital
- \$1.7M Annual O&M (excludes loan payment)

12,080 acres

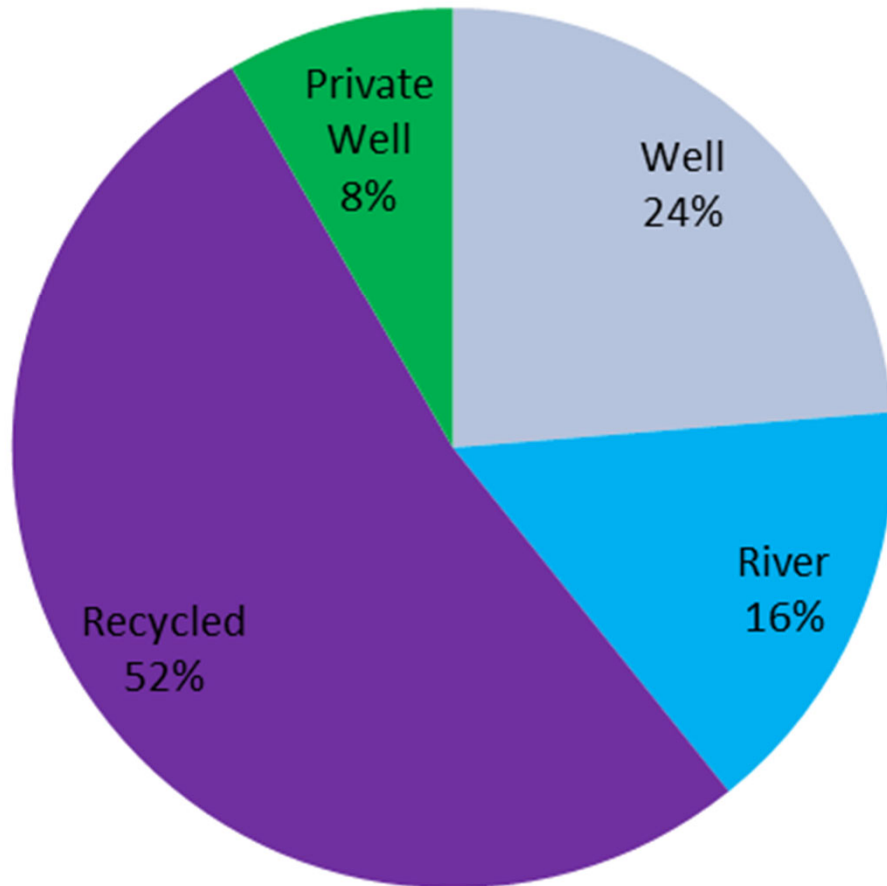


Salinas River Diversion Facility

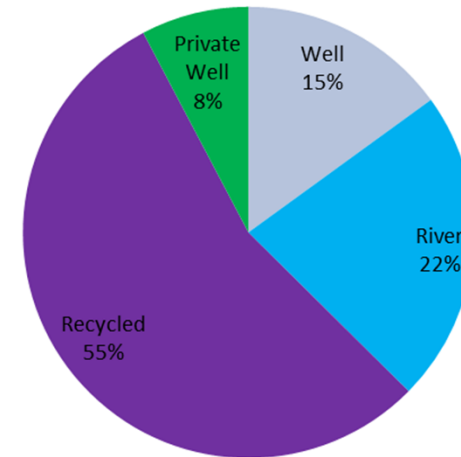


M1W Regional Treatment Plant

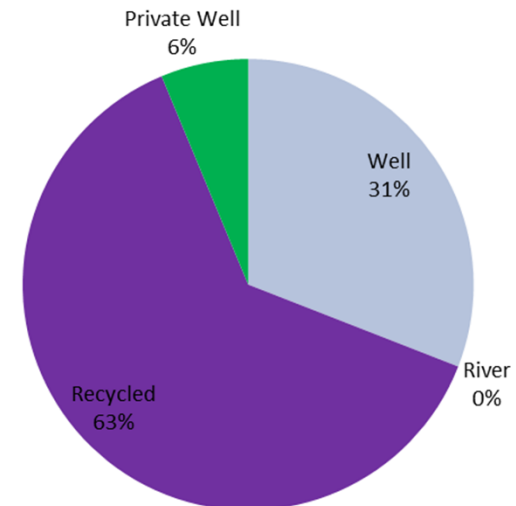
Average Annual Total Water Production By Source



Average Annual Total Water Production With River Water

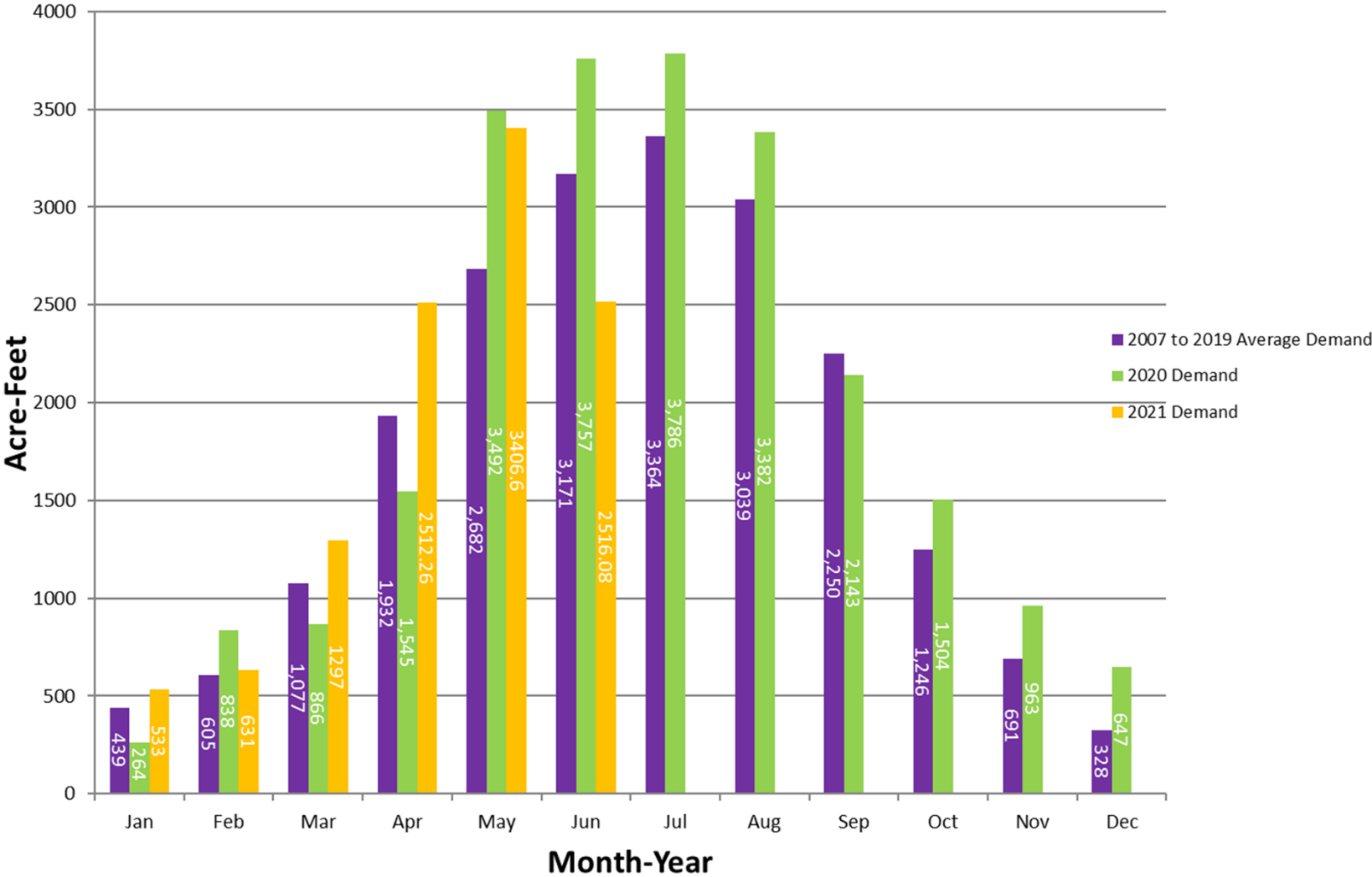


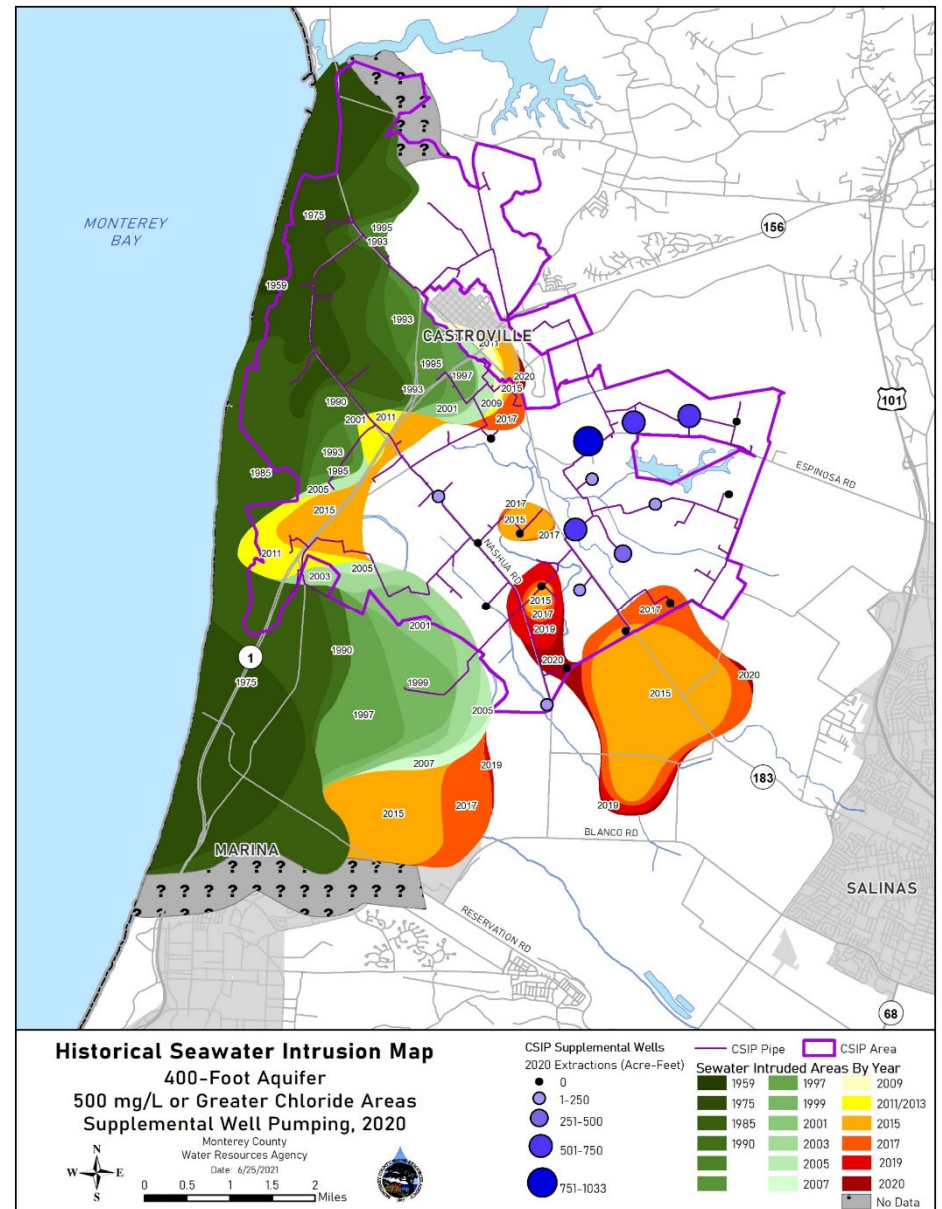
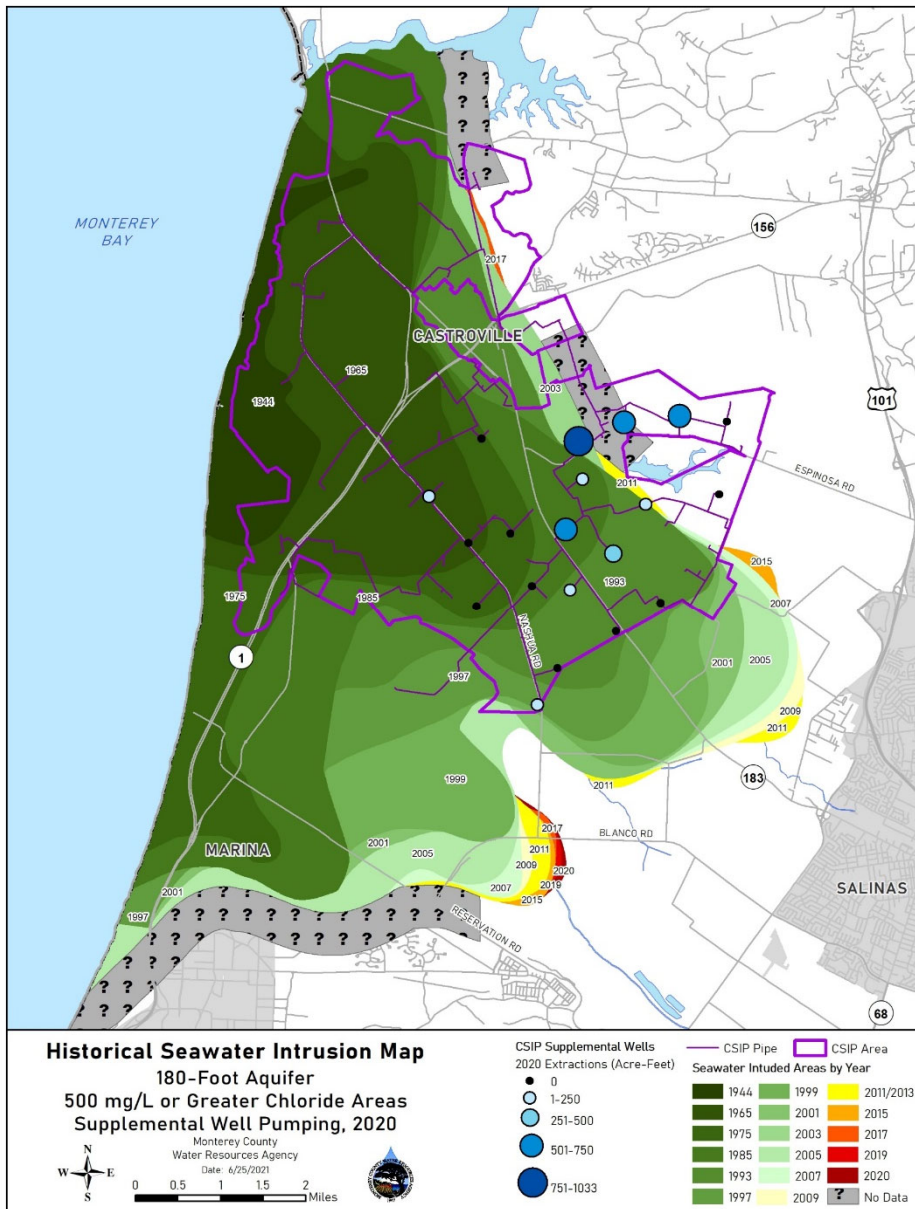
Average Annual Total Water Production Without River Water





CSIP Monthly Average Total Water Demand







Current Drought Situation

- Reduction of all three water sources:
 - Wastewater decline since 1998
 - Well supply decline since 1998
 - River water unavailable, July 2021

- Irrigation demand has increased



Current Drought Situation

- Water scheduling and limiting total daily demand will be necessary this season
 - 10-30% reduction in total supply
 - 16-hour irrigation day to reduce daily peaks



Longer Term Solutions

- Optimization and conservation efforts
- Project boundary expansion
- New wells inside or outside of Project boundary
- Additional new sources of water
- Build project using other water rights
- Store water when there is excess
 - Increase storage throughout the system
 - Increased storage at the reservoirs
- Drought reserve/water banking
 - Increase use of recycled water in off-peak season in exchange for reduction in groundwater pumping



Summary

- CSIP has reduced the rate of seawater intrusion in the Pressure Subarea.
- Consecutive dry years affect water in storage at the Reservoirs and reduce water supply to CSIP.



Summary

- Monterey County is experiencing extreme drought conditions.
- Reservoir releases will be curtailed this season.
- Groundwater Impacts are delayed but a third consecutive dry winter will result in little if any water in storage for groundwater recharge and SRDF operations next year resulting in localized impacts to groundwater supplies.
- A fourth consecutive dry winter in 2022 – 2023 will result in significant basinwide impacts to groundwater supplies.
- Extended drought conditions will impact reservoir operations well beyond the period of drought.
- CSIP continues to provide water but with looming limitations and expected further reductions in water supply if drought conditions persist.
- Numerous long-term solutions exist.